Lorentz Force Propulsion

Feasibility Study

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Abstract

A charged object in motion through a magnetic field will generate a force per Maxwell's equations. This force was first investigated in detail by Lorentz, and so is referred to as a "Lorentz force". Professor Mason Peck of Cornell University was the first to investigate the possibility of using a charge on a spacecraft for propulsion, beginning in 2006 with a NASA Institute for Advanced Studies (NIAC) project. Peck and his students established the basic principles, developed a control law, and identified potential mission applications. An internal research effort funded by the Marshall Space Flight Center has advanced this technology and developed new potential applications. The Lorentz Force spacecraft method of propulsion Technology Readiness Level (TRL) has been increased from 1 to 3. We achieved the most comprehensive and successful testing a charged test article in a Low Earth Orbit (LEO) space-like plasma to date, successfully shielded that plasma, and further defined and expanded the potential mission applications of this revolutionary in-space propulsion concept.